UNEDITED LETTERS OF HUBER

By Edouard Bertrand

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Introduction

By Edouard Bertrand

The "New Observations upon bees" of Francis Huber make very interesting reading. When I resolved to read them, however, I did not anticipate the intense pleasure which they gave me.

Indeed, if there are still literary productions of the late eighteenth century that are read, we know in how small a proportion. Hardly one book in ten thousand has withstood the test of time. What a lesson in philosophy and what a menace towards the future of our contemporary works! Concerning works of science this proportion is still more disastrous. Everything has changed, everything has been perfected in so speedy a manner that the recital of information dating back a century generally offers no interest for us. From the enormous accumulation of scientific works of that time, there are few capable of instructing us yet; and they are nearly all on Natural History. Among this elite, the "New Observations" of Huber shine with a particular eclat, with an ensemble of qualities so harmonious and original that we would seek them vainly elsewhere. The charm of a style which is always pure is allied with a very simple and yet very clever expose; the ingenuity of the observations is so extraordinary that one soon gives way to the sentiments of an aroused admiration for this blind man, whose genius was at all times equal to well-nigh insurmountable difficulties.

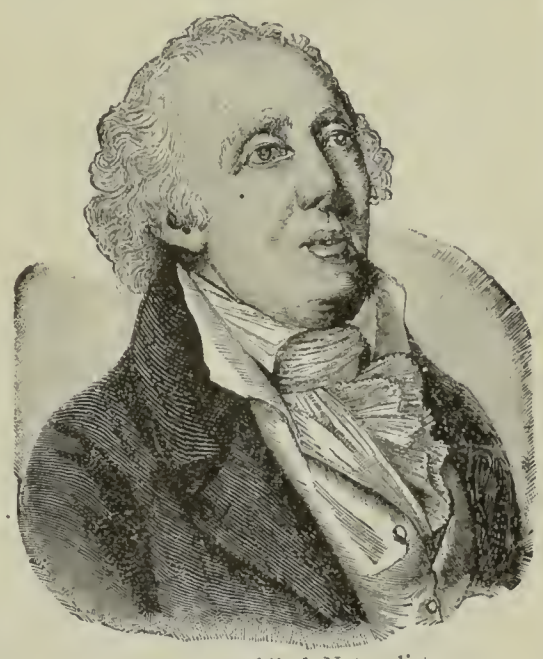
I.

Francis Huber, born in Geneva in 1750, died in 1831. * Note.

When he became blind he was engaged to a Miss Aimee Lullin, and this young lady was faithful to him, in spite of contrary advice which was given her. She was to be rewarded for it by the happiness of her entire life.

Huber narrates himself (New Observations, page 1) how he became interested in bees. He was fond of sciences and did not lose this fondness when he lost his eyesight. He had his servant, Francis Burnens, read to him the best works on physics and natural history. This man took great interest in these readings and Huber quickly noticed his wonderful aptitude as an observer. He resolved to cultivate this talent, and caused him first to repeat some of the most simple experiments of physics. These he executed with a great deal of skill, improving upon the few instruments that were intrusted to him, applying them to new uses and even making, himself, the implements which he needed.

"The continuation of our readings," says Huber, "having led me to the beautiful works of Mr. Reaumur upon bees, I found in his book such a fine plan of experiments, observations made with so much art, a logic so wise, that I resolved to study particularly this celebrated author, to shape my helper and myself at his school, in the difficult art of studying nature. We began by watching bees in



Huber, the blind Naturalist

glass hives; we repeated all of Reaumur's experiments, and we secured exactly the same results when we used the same processes. This agreement of our observations with his gave me great pleasure, because it proved to me that I could rely entirely upon the eyes of my helper. Emboldened by these first trials, we attempted to make upon the bees some entirely new experiments; we contrived the building of several hives, of which I had never thought, and which presented great advantages, so we had the good luck of discovering remarkable facts which had escaped the notice of Swammerdam, Reaumur and Bonnet. It is these facts which I now publish in this work; there is not one of them that we did not try several times over, during the eight years in which we made researches upon the bees."

This modest expose retains surprises for the reader, for it does not give a presentiment of the importance and of the difficulties of the researches which followed.

Francis Burnens was not only an intelligent man, he was gifted with great tenacity. He often would follow, for 24 hours, without food or rest, the actions of a few worker-bees which he suspected of being fertile, in order to detect them while in the act of laying. Once, even, he spent 11 days examining the bees of several colonies, one after another.

Huber directed the experiments and devised them so as to retain the control. Nothing is more interesting than this association, which lasted too short a time, for in 1795 Burnens left him to live at Oulens, where his fellow citizens, aware of his capacity, made him a magistrate.

On the other hand, he did not cease his bee work, and from time to time he replied to the requests of Huber by additional experiments. I have had the good luck, through my friend Mr. Edw. Pictet, to publish one of those letters of Burnens, in answer to a question upon the sphinx atropos (Revue Internationale, 1885, page 85). A footnote of Huber, in communicating this letter to Mr. M. A. Pictet, of the Academy of Geneva, shows what sentiments Huber had towards Burnens.

"You will see that the writer of this letter has what is needed to become an excellent observer—good eyes and good logic. You will acknowledge that it is a pity that an instrument which I had sharpened be no longer in my hands. Burnens is justice of the peace at present (New Observations, Preface); he does not waste his time; his entire life is being spent in preventing his fellow countrymen from eating out one another's white of the eyes' and ruining themselves in law suits. I had not thought that my lessons would put him there. His observation is very important. It proves that bees, which contract the entrances of their hives when they are threatened with invasion, do not do it when it is unnecessary. It is therefore the circumstances which prompt them; they never make any mistake."

The first edition of the "Observa-

Note—His father, Jean Huber, had the reputation of being one of the wittiest men of his time and was often cited by Voltaire, who appreciated his conversation; he was a pleasant musician, wrote poetry which was even praised in the Ferney drawing rooms, was known for his quick piquant rejoinders, was an easy and talented painter, excelled in the art of cutting out paper landscapes in such a manner that he appeared to have created this method, carved better than an amateur sculptor, and to these talents he added the taste and art of animal study. His work upon the flight of birds of prey is even now referred to with profit by naturalists. Jean Huber transmitted most of his tastes to his son. (From the notice of P. A. De Candolle upon Francis Huber.)

Note. Pierre Huber, the son, was himself a naturalist of merit, already known through his "Researches on the Habits of Ants," published in Geneva and in Paris in 1810, and republished in 1861. Here is the list of a few of the bulletins which he published in periodical works: "Memorandum on Divers Instruments of Physics and meteorology" (Society of Physics and Natural History of Geneva, Vol. 2). "Notice Upon a Migragration of Butterflies" (Ditto, Vol. 3). "Memorandum to Serve Upon the History of the Caterpillar of Hammock) (Ditto, Vol. 7, part 1). "Relations of Ants with Lice and Gall Insects" (Brit. Biblith. of Science & Arts, Vol. 28). "Observations Upon Several Species of Bees" (Vol. 6 of the Linnean Society of London). An extract from this was published in volumes 25 and 26 of the British Library under the title: "Observations Upon Several Species of Bees Known Under the Name of Humble-Bees." "Letters Upon a New System of Meteorography" (Biblio. Universelle, 1828). "Letters Upon Aeronautic Spiders," (Posthumous article in Biblio. Universelle, 1866.

tions" on bees was published in Geneva in 1792. It contained a series of articles in the shape of letters to Mr. Bonnet, who had induced Huber to publish his notes. There was a reimpression published in Paris in 1796, in one volume in-12, to which was added a short, practical treatise on bees, anonymous.

A second edition was made in 1814, in two volumes. For the second, Huber, for want of Burnens, employed his wife, and later his son, as assistant.

Born in Geneva in 1777, Pierre Huber died at Yverdon in 1840.

This curious and beautiful work made the reputation of Huber and secured for him a membership in most of the academies of Europe, especially the Academy of Sciences of Paris. It also caused his being called at present the founder of modern beekeeping.

(To be continued)

UNEDITED LETTERS OF HUBER

Introduction

(Continued from September)
(Translated from the French by C. P. Dadant).

Here is a resume of the discoveries of Huber, by the noted A. P. De Candolle:

"The origin of beeswax was then a much discussed point of the history of bees, by naturalists: some of them had said, but without sufficient proof, that they made it of honey; Huber, who had successfully unraveled the origin of propolis, confirmed that opinion concerning beeswax through numerous tests and showed especially, with the help of Burnens, how it oozed from the rings of the abdomen, in the shape of scales. He made extensive experiments to ascertain how the bees prepare it for their combs. He followed, step by step, all the constructions of those marvelous hives in which the bees seem to solve the most subtle problems of geometry; he assigned the role which each class of

bees plays in this work, and followed their labor from the rudiment of the first cells to the complete perfecting of the combs. He made known the ravages caused by the sphinx atropos (death's head moth) in the hives which it enters; he even tried to unravel the history of the senses of bees, and particularly to seek the seat of the sense of smell, the existence of which is demonstrated upon the entire natural history of insects, while their structure has not yet permitted to locate it with certainty. Lastly, he made interesting experiments on the breathing of bees; he proved by several experiments that those insects need oxygen just as do other animals. But how can air be renewed and retain its purity in a hive closed everywhere, except at a small entrance, with a sort of putty? This problem required all the sagacity of our observer, and he came to recognize that the bees, by a peculiar motion of their wings, set the air in motion so as to secure its renewal; after having taken note of this, he even proved his statement by imitating this ventilation through artificial means.

These experiments on the breathing of bees required some analyses of the air of the beehives, and this requirement caused Huber to come in contact with Senebier, who was making analogous researches upon plants. Among the means that Huber had thought out to ascertain the quality of the air in the hives was that of germinating some seeds within the hive, basing himself upon the idea that seeds will not germinate in an atmosphere too much deprived of oxygen. This experiment, though imperfect for the purpose intended, brought to the two friends the idea of making researches on germination; and the most curious part of this association of a blind man with a clear-sighted man, was that it was usually Senebier who suggested the experiments, and Huber, the blind man, who executed them.

II.

This is what was known, up to that time, of the works of Huber. He died September 22, 1831, and his life, after 1814, was unknown. It was, however, not admissible that he should have stopped making observations, after taking so much interest in the subject for 25 years. Moreover, the end of the preface of the second volume of his 1814 edition indicated exactly the opposite.

"I might," said he (New Observations, Vol. 2, page 6) "add several observations to those which I now give to the public; but they do not present a sufficiently connected aggregate, and I prefer to wait till they may be accompanied with facts upon which they have a bearing."

A lucky concourse of circumstances permits me today to partly make good this shortage.

In 1890, during a visit of apiaries which I made in Savoy, in company with Messrs. De Layens and Cowan, I learned from M. E. Mermey, of Aix-Les-Bains, a young beekeeper who had followed my course of lessons at Nyon, that the father of a neighbor beekeeper, M. Ch. De Loche, possessed among his family papers a number of unedited letters from Francis Huber, addressed to his grandfather, Count Mouxy De Loche. We hastened to visit the Castle of Loche to solicit the permission of reading those letters. The Count was momentarily absent, but we were given the best welcome by his sons, who promised to transmit our request to their father. The latter had the kindness to visit us that same evening at Aix and did me the great favor of entrusting those letters to me with the permission to publish them.

His grandfather, Francis de Mouchy, Count De Loche, born at Gresy-Sur-Aix, in 1756 and deceased in 1837, was an observer and a savant of merit. After having served in the army of the House of Savoy and reached the position of Major General, he had withdrawn to Turin, later to Loche, to devote himself more completely to his taste for natural history and archeological researches. He published a great number of works on natural history, archeology, history, agriculture, etc.

But my good fortune did not end there. When I published, in 1894, a new edition of the remarkable memorandum of A. P. De Candolle upon the author of the "New Observations," I sent a complimentary copy of it to Mr. Georges de Molin, engineer at Lausanne, grandson of Francis Huber. This kind old man hastened to inform me that he was just then busy sorting papers which had been forwarded to his mother by the heirs of his uncle, Pierre Huber, after the death of the latter, and that there were among them quite a number of letters from his grandfather, nearly all relative to bees. Although he believed that his uncle had taken from these letters and perhaps inserted in the "Annals of the Society of Physics" of Geneva anything which might interest scientists, he offered them to me in case I should desire to inspect them. Looking through the above mentioned "Annals," we found no trace of these letters whatever.

In the file of letters which were kindly loaned to me by Mr. De Molin,

New York farmer's roadside market.

I found a certain number of first drafts of letters addressed to Miss Eliza De Portes, at Bois d'Ely, near Crassier. Having obtained information from a friend of the family, I learned that the young lady correspondent of Huber had become Mrs. De Watteville, and that she was residing at Berne.

This venerable lady, now more than octogenarian, was kind enough to loan me the entire collection of those letters, found in a volume of manuscript, and sent with the parcel the following words, which I take the liberty of publishing:

"My niece, who is returning to Bois d'Ely, is kind enough to bring to you the letters of my friend and venerated master, Mr. Huber, of which I have copied a great number in order to make them more easy to read. You may keep them as long as you desire, and may use them freely for your magazine. I will be happy if they can inspire a taste for natural history, together with a simple and fervent piety."

In all those letters, the striking fact is the religious sentiment of Huber, his conscientious spirit, his constant desire of giving credit to his predecessors and his skill in directing and understanding the experiments of his helpers. "I am more certain than you are of what I am telling you," said he to De Candolle, "for you publish that which your own eyes alone have seen, while I take the average of several testimonials."

It would be difficult to show greater philosophy and greater resignation to one's infirmity.

We may admire, also, the correction and clearness of his style, especially in the "New Observations," for we must not forget that he was an octogenarian when he wrote to Miss De Portes, and that his dictation was through two inferior clerks at least: the one to whom he dictated the letters and the one who copied them for the bound manuscript.

One was astonished at all that Huber had discovered; one will be much more so after reading these letters, in which new views and the very best practical suggestions abound. After him, little has been discovered outside of parthenogenesis; his observations were so precise and so positive that all the modern works, however considerable, have only proven a following of his and a confirmation of his, without amending them. For this reason, I believe that the publication of his unedited correspondence will be welcomed with lively interest by beekeepers in all countries, and I here republish the expression of my hearty thanks to Mrs. De Watteville, the Count De Loche, Mr. De Molin, and Mr. Edmond Pictet for their kindness in entrusting to my care, for publication, the unedited writings of the great observer of the bees.

Edouard Bertrand (1897).

(To be Continued.

(In our next issue will appear the first of the letters written by Huber to Miss Eliza De Portes. These letters give a fascinating account of the observations of the great naturalist).

DO BEES HEAR?

By E. M. Barteau

So far as I am aware, the only affirmative evidence that bees hear is based on the fact of the "piping" and "quahking" of the emerged and unemerged virgins, respectively.

If it could definitely be proven that these pipings, etc., were challenges and answers, it would be further corroborative proof that bees actually hear.

Isn't it a fair asumption that these cries of the young queens are their even'song, like the note of the whippoorwill and the peeping of frogs at dusk?

Don't we assume the "challenge and answer" of the queens, because of their known antagonism?

Mr. Holterman (page 179, May) says: "I have had no doubt that a pan, or any other noise that would drown the sound of the queen flying, would bring the bees down."

Isn't it a little more likely that the bees are cognizant of the queen's presence by her odor?

We all know how fond the bees are of the hand that has just held a queen, and how quickly they locate a cage that has lately contained a queen, if only for a few minutes.

Isn't it probable that a swarm, when traveling, maintains its elliptical mode of flight in order that the bees be continually brought to the leeward of the queen and thus be sure of her presence—more likely by scent than by sound?

The queenless swarm does not usually cluster; if it does, it soon breaks and returns. Can it discover its queenless condition, when clustered, by the noise of the queen's flight?

Let's attribute it to odor until a more satisfactory answer is given.

As stated above, the queenless swarm usually returns to its hive without clustering.

If you, my dear Mr. Holterman, can succeed in "dishpanning" a queen-right swarm into returning to its hive, we will surely take our hats off to you.

New York.

(On this subject it may be interesting to read the explanations Huber gave, about a hundred years ago, concerning the piping and quahking of the queens. He wrote of a young queen about to hatch:

"We could discern that the silk of the cocoon was cut circularly, a line and a half from the extremity; but the bees being unwilling that she should quit her cell, had soldered the covering to it with some particles of wax. What seemed most singular was, this female emitting a very distinct sound or clacking, from her prison, which became still more audible in the evening, and even consisted of several monotonous notes in rapid succession."

A little farther along he wrote:

"The first queen-cell opened on the 9th. Its young queen was lively, slender and of brown color. . . . . When she approached the other royal cells, the bees on guard pulled, bit her and chased her away; their irritation seemed to be greatly excited against her, and she enjoyed tranquillity only when at a considerable distance from those cells. This proceeding was frequently repeated through the day. She twice emitted the sound; standing, while doing so, with her thorax against a comb, and her wings crossed on her back, in motion, but without being unfolded or farther opened. Whatever might be the cause of her assuming this attitude, the bees were affected by it; all hung down their heads and remained motionless. . . . .

"The queen confined in the second cell, which she had not yet left, was heard to pipe several times. . . ."

Surely this piping and quahking is a mode of expressing their anger or restlessness. We hear it often in cages of queens that are being forwarded by mail. Whether the bees have organs of hearing, or not, this indicates that they are more or less affected by the noise produced by angry queens.—Editor.)